

Remarks/Arguments

The Examiner is thanked for the careful review of this Application. Claims 1-10 and 16-21 are pending after entry of the present Amendment. Claims 11-15 were cancelled.

Rejections under 35 U.S.C. § 103:

The Office has rejected claims 1-8, 10, and 16-21 under U.S.C. 103(a), as being unpatentable over United States Patent 5,242,532 to Cain in view of United States Patent 5,198,072 to Gabriel. In a like manner, the Office has rejected claim 9 as being unpatentable over Cain in view of Gabriel and further in view of the United States Patent 5,843,8115 to Liaw. Applicants respectfully traverse the Office's rejections and submit that independent claims 1, 6, 16, and 21 are patentable over the cited references, as no combination of the cited prior art would have suggested the claimed invention to one of ordinary skill in the art.

Citing to Cain, the Examiner has found Applicants' argument that Cain fails to directly deposit the dielectric layer over the surface of the substrate, unpersuasive. For support, the Office has cited to Figure 3C of Cain, asserting that the dielectric layer 344 of Cain is formed over the stop layer 340 and the surface of the substrate 306. The Office then asserts that Cain discloses forming the dielectric layer directly over the substrate.

It is respectfully submitted that the Office has not addressed specific features of the claimed invention, as defined in claims 1, 6, 16, and 21, wherein the dielectric layer is formed directly over the surface of the substrate without forming an etch stop layer. Contrary to the Office's contention, Figure 3C of Cain in fact establishes that the dielectric layer 344 has been formed on a thin layer 340, and not directly on the surface of the substrate layer. In Figure 3C, a 306 layer is shown between the thin layer 340 and the surface of the substrate 306 with the 312 layer covering the surface of the substrate 306. Thus, Figure 3C establishes that the thin layer 340 and a layer 312 separate the dielectric layer 344 and the surface of the substrate 306.

Still further, the passage defined in column 5, lines 50-54, of Cain provides:

The sole purpose of the thin film 340 is to provide a marker for stopping a high power plasma etch process before the underlying gate and substrate are damaged. For this reason the thin film layer 340 may be called a sacrificial layer. (Emphasis added.)

Thus, the portion of the detail description explaining Figure 3C of Cain explicitly states that the thin film 340 is defined on the substrate surface and not the dielectric layer 344.

Applicants also draw the Office's attention to claim 6 of the claimed invention wherein Applicants specifically claim that the ILD overlies the gate structure, the spacers, and the first surface of the substrate. In contrast to the claimed invention, as defined in claim 6, the dielectric layer of Cain also fails to overly the gate structure and the spacers, as the thin layer 340 on the gate structure and spacers and thus separates the dielectric layer from the gate structure and spacer. Reconsideration in view of these points is respectfully requested from the Office.

Next, the Office has found Applicants' arguments that Cain uses optical emission method to detect endpoint of the dielectric layer and that Cain fails to teach or suggest using a bias compensation endpoint detection method to detect the endpoint of dielectric layer to be unpersuasive. Specifically, the Office has cited to column 8, lines 56-59 of Cain, asserting that Cain discloses an apparatus that is sensitive to DC bias level of the plasma. The Office is respectfully directed to column 8, lines 61-64 of Cain, which provides:

In DC-bias monitoring etchers an end point signal would be triggered by the change in the DC bias of the plasma occurring upon initiating etch of the thin film. (Emphasis added.)

Cain thus, uses the sacrificial layer to detect the endpoint of the dielectric layer and without the sacrificial layer, and Cain cannot use the DC bias monitoring to detect the endpoint of the dielectric layer.

Next, the Office has found Applicants argument that Cain does not disclose etching through the ILD and exposing of a portion of the surface of the substrate unpersuasive. In particular, the Office has cited to Figure 6F contending that a contact/opening is shown etched through the dielectric layer 510 exposing the surface of the substrate at the bottom of the contact. Cain detects endpoint of the etch operation when the thin layer of sacrificial dielectric is being etched. As such, after etching through the dielectric, Cain has to first etch through the sacrificial dielectric before the contact and vias can be formed.

It is respectfully submitted that Gabriel cannot cure the pointed of deficiencies in Cain because Gabriel does not use the bias compensation endpoint detection of the ILD to detect etching through the ILD layer. Specifically, Gabriel teaches etching the dielectric layer in two stages using two different plasma etching processes. During the first plasma etch process, the first layer of ILD (i.e., the layer of ILD being defined up to the point of

etch-through in the dielectric layer) is etched and the etch end point detection is performed by monitoring the impedance of the wafer.

Then, during the second etch process wherein the remaining layer of the ILD is etched using a less aggressive etch process. Thus, in Gabriel the change in impedance is not used to detect etch through the ILD layer. Additionally, the bias compensation endpoint detection method of Gabriel detects changes in impedance of the wafer. Furthermore, Gabriel does not teach, disclose, or suggest a method for use in fabrication of a self-aligned contact (SAC) structure, since Gabriel is silent as to SAC structures.

Lastly, the Office has rejected Applicants' argument that modifying Cain using the teaching of Gabriel would add several additional stages to the etch process, citing to the open claim language of the claimed invention. It is respectfully submitted that the alleged open claim language of the claimed invention cannot alter the features of the claimed invention wherein the dielectric layer is formed on the substrate surface directly. In Cain, before the dielectric layer can be formed, the sacrificial layer (i.e., the thin layer) must be first fabricated over the surface of the substrate. However, the claimed invention eliminates the same stage (i.e., the stage of forming the sacrificial layer). As Applicants fabricate the SAC structures without using the sacrificial layer (i.e., with one less stage), forming the thin layer over the substrate surface in Cain includes an additional stage in fabricating the SAC structure.

As stated in more detail in Applicants' Amendment, Liaw fails to cure any of the deficiencies pointed out with respect to Cain and Gabriel, as Liaw focuses on process for fabricating a MOSFET device for a triple polysilicon SRAM process.

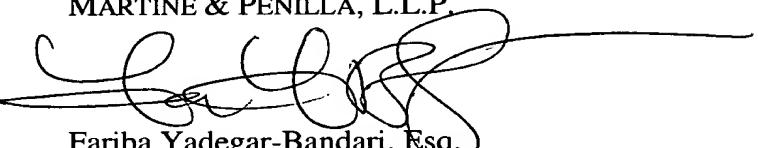
With respect to claim 21, it is submitted that none of the combination of the cited prior art discloses that the endpoint signaling change in the bias compensation voltage is detected when a portion of the surface of the substrate underlying the contact hole is substantially exposed. In fact, Cain and Gabriel greatly emphasize the opposite, wherein a portion of the underlying substrate is not exposed during the etching processes.

Therefore, it is respectfully submitted that independent claims 1, 6, and 16, and 21 are patentable under 35 U.S.C. § 103(a) over any combination of the cited prior art. In a like manner, dependent claims 2-5, 7-10, and 17-20 which incorporate each and every element of the applicable independent claim are patentable under 35 U.S.C. § 103(a) over any combination of the cited prior art for at least the same reasons discussed above.

Applicants hereby submit that this Request for Reconsideration complies with 37 C.F.R. 1.116(b) and should be entered.

In view of the foregoing, Applicants respectfully submit that all of the pending claims 1-10 and 16-21 are in condition for allowance. Accordingly, a Notice of Allowance is respectfully requested. If the Examiner has any questions concerning the present Preliminary Amendment, the Examiner is kindly requested to contact the undersigned at (408) 749-6900, ext. 6913. If any additional fees are due in connection with filing this Amendment, the Commissioner is also authorized to charge Deposit Account No. 50-0805 (Order No. LAM2P258). A duplicate copy of the transmittal is enclosed for this purpose.

Respectfully submitted,
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